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ABSTRACT

This document contains a project report and curriculum materials from a project that developed a model for basic math, reading, and science instruction to prepare educationally disadvantaged adults for entry into science-related training programs. The 15-week curriculum consists of reading instruction, applied basic mathematics, universal analytical/physical concepts, counseling, and world of work skills. According to the report, 40 adults with reading and math skills as low as the seventh-grade level received classroom instruction and pre-lab training geared toward gaining entrance into Bidwell's Chemical Lab Technologist or science-related training programs. Of these 40, 80 percent completed the program and 60 percent were accepted into vocational training programs. The science/math component consists of the following: a list of objectives, list of demonstrations and activities using household supplies, list of instructional materials, list of reference materials, science vocabulary listing, list of common compounds, bibliography listing nine items, and list of 27 books for additional reading. The reading component includes the following: lists of goals and objectives, planning calendar, explanation of instructional strategies, and materials on vocabulary, software, comprehension, textbook reading strategies, content-area reading, notetaking, employability, evaluation, and contents of a student reference folder. (YLB)

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ED 373 177

Pre-Math/Science Training for Chemical Laboratory Technologist

Bidwell Training Center, Inc.
1815 Metropolitan Street
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353 Grant: $21,000
Project #: 98-3005
FY 92/93

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Table of Contents

Page

Abstract Page.....1

Abstract.....2

A. Introduction.....3

B. Body of the Report.....7

1. Statement of the Problem.....7

2. Objectives.....8

3. Procedures.....9

4. Positive Results.....13

5. Limitations.....14

6. Evaluation.....14

7. Dissemination.....15

8. Summary & Conclusions.....15

C. Science/Math Component.....16

D. Reading Component.....34

Charts

1. Planning Calendar
2. Reading Prescription
3. Phonetic Analysis
4. Reading Improvement Activities
5. Group Reading & Writing Analysis
6. Steps in SQ3R Method
7. Questioning: Categories & Definitions
8. Seven Styles of Learning
9. Summary of Rules
10. Testing Scores
11. Fry Readability Graph

ABSTRACT PAGE

Title: Pre-Math/Science Training for Chemical Laboratory Technicians

Project No.: # 98 - 3005 Funding: $21,000

Project Director: Valerie Njie Phone No.: (412) 323-4000

Agency Address: 1815 Metropolitan Street, Pittsburgh, PA 15233

Description: The project developed a model for basic math and science instruction to prepare educationally disadvantaged adults for entry into science related training programs. The 15 week curriculum consists of reading instruction, applied basic mathematics, universal analytical/physical concepts, counseling and world of work skills. Forty adults with reading and math skills as low as the 7th grade level received classroom instruction and pre-lab training geared toward gaining entrance into Bidwell's Chemical Lab Technologist or science related training programs.

Objectives: To create a vehicle for academically disadvantaged adults, especially minorities and women, to strengthen basic math and science skills that will enable them to successfully enroll in and complete a high-tech or science related training program; to ultimately become gainfully employed as chemical laboratory technologists, pharmacy technicians or other positions requiring a strong math and science background.

Target Audience: Academically disadvantaged adults in Allegheny and surrounding counties who wish to gain entry into and successfully complete Bidwell's Chemical Laboratory Technologist, Pharmacy Technician or other science related training programs.

Product(s)--if applicable:

Final Report and package of instructional materials.

Method(s) of Evaluation:
1. Development of materials for appropriate reading and math level
2. Enrollment of 40 adults
3. 80% completion
4. The number of Pre-Math/Science students who pass entrance exams, are accepted into and enroll in science related training programs beginning July 1993.
5. 60% acceptance into vocational training programs

Findings: Adults with marginal academic skills, given sufficient instruction prior to vocational training can be equipped with the science discrimination, observation and world of work skills needed to pass entrance test and gain entry into a science related training program.

Conclusions:
The Pre-Math Science Program for Chemical Laboratory Technologist was successful at meeting its goals. Students with a minimal background in science, at varying academic levels were prepared for entry into a chemical laboratory or science related training program. They received the necessary integrated math/science, reading, observation, discrimination and world of work skills necessary to gain entry into and remain in a science related training program.

Descriptors: (To be completed only by AdvancE staff)

ABSTRACT

In 1991, eight chemical companies collaborated with Bidwell Training Center, Inc. to develop a chemical laboratory technologist program for positions which were in demand throughout the industry. This partnership was nothing new to Bidwell which had years of experience designing customized job training programs for companies. What was new however, was the drop-out and failure rate experienced during the first two years.

Since most of the drop-outs occurred within weeks of beginning training, it was obvious that the 12.0 reading and 75% math entry requirement was not a sufficient indicator of one's ability to compete in such a vocational setting. Many adults suffer from math, science, and test-taking anxiety; preventing them from taking advantage of the ever-increasing training and employment opportunities which exist in the region. Science related employment will continue to remain out of reach to many individuals unless public schools, training institutions, government and industry do something to bridge the gap.

This project offers one solution which proved that given sufficient instruction, adults with marginal reading and math capabilities can learn the skills which are paramount to one's success in a variety of science related training programs. This report presents an overview of a course of study developed to assist academically disadvantaged adults prepare for successful entry into training programs which require more advanced knowledge of science and math. It highlights the instructional strategies employed by instructors to equip students with the math, reading, note-taking, science discrimination, observation and world of work skills needed to pass test, gain entry into and compete in a science related training program.

This report is useful to adults who need to improve basic math and science skills prior to enrolling in a chemical laboratory technologist, pharmacy technician, nursing, or other science related training program. Institutions or agencies which conduct technical training programs which require a higher degree of math and science skills will find the report useful. It is useful to ABE/GED programs that have students who are interested in pursuing science or health related occupations. Labor and Industry, J.T.P.A., or other funding institutions that tract employment trends and have a need to prepare individuals for tomorrow's technological careers will find the report useful. Corporations that need to upgrade their existing work force for advanced positions may also see value in the report.

A. INTRODUCTION

Bidwell Training Center, Inc. is a non-profit vocational training school located on the northside of Pittsburgh. Since 1968, we have served the disadvantaged/dislocated population in Pittsburgh, Allegheny County, and surrounding areas. We currently offer courses in literacy/ABE and GED skills, word processing, personal computer, medical secretary, medical transcription, pharmacy technician, culinary arts and chemical laboratory technology. Bidwell has successfully trained and placed thousands of students who have taken advantage of our numerous course offerings.

In 1987, after 18 years of providing academic instruction for vocational purposes, it became evident that those most in need, with reading skills below the 7th grade level had been ineligible for vocational training opportunities. Our target population then shifted to include the following: those lacking basic reading, writing and math skills that would enable them to seek employment, complete applications, or enroll in training; the ever present segment of population that had never been employed and lacked basic survival skills; and individuals affected by plant closing's and high unemployment who lacked transferable skills that could be adapted to careers in today's market.

In 1991, eight chemical companies collaborated with Bidwell Training Center, Inc. to develop a chemical laboratory technologist program for positions which were in demand in the chemical industry. The companies expressed a need for a new level of technicians who could be trained as laboratory observers. This was necessary to free up degree people to do more skilled and analytical tasks.

Entry criteria for the chemical lab course required applicants to score 12.0 on a Gates McGinite Reading Test and 75% on the numerical section of the APT/Form A Standardized Inventory Test. The Career Ability Placement Survey was also administered prior to being considered for an interview and accepted into training. Despite these high standards, approximately 50% of the enrollees dropped out within the first month of training. Most were overwhelmed by the curriculum, and had extreme difficulty applying math to scientific concepts.

A second group with stronger math skills began four months later. They however experienced similar difficulties due to a lack of understanding basic science concepts. Only sixteen of the combined 34 students completed training; resulting in insufficient candidates for externships and low job placement. Nevertheless, the eight corporations remained involved and pledged to continue their support.

As outside observers, several things seemed apparent to the literacy/ABE staff which were discussed with the chemical laboratory staff. While science is taught from first through 12th grade, many of our adult students have either been out of school more than 15 years, or left school prior to graduating. This reality can pose a serious problem, especially when having to tackle a curriculum which requires a high level of proficiency in basic science. One possible solution to the high drop-out rate could have been to administer a pre-test which determined each applicant's knowledge of science. This however would have screened out the majority of people who were capable of succeeding, given some pre-math/science instruction. Our pre-math/science program however, can meet the chemical

companies continued needs while bridging the academic gap students experienced during the program's first two years.

The major objective of the project was to establish a feeder program that would serve as a model to prepare adults for science or health related training programs which require a high degree of proficiency in science and math.
The program not only increased students' basic skill levels, but also gave them the necessary foundation in safety, basic chemistry and physics terminology concepts.

Two years of experience had proven that high academic skills alone were not a sufficient indicator of one's ability to successfully complete this type of technical program. We were especially careful to design a comprehensive program which addressed the total needs of our participants. The program focused on math and science anxiety which is generally experienced by our adult population. An additional component was the personal and career development needed to successfully complete training and become gainfully employed in the chemical industry or other math/science related fields.

The project proved that adults with marginal academic skills, given sufficient instruction prior to vocational training, can be equipped with the science discrimination, observation and world of work skills needed to gain entry into and compete in a science related training program.

The sixteen week program was conducted between March 15, 1993 and June 25, 1993. Instruction was provided Monday thru Friday, from 9:00 a.m. - 4:00 p.m. Classes were open-ended with new students applying the first and third Tuesday and Friday mornings monthly and enrolling one week later.

Josifani Moyo assisted in designing the program, supervised staff and provided math instruction. Dr. Theo Towns, Director of the Chemical Laboratory Program on loan from PPG Industries, assisted in program design and structure. Gloria Muskat developed the science curriculum, designed materials and instructed science and math classes. Dr. Shirley Lewis developed the reading/note-taking curriculum, instructed classes and designed materials. Dr. Lewis also provided personal/career counseling services and addressed world of work and attitudinal issues in the corporate arena. Cassandra Wilson, secretary, tracked attendance, typed instructional materials and reports and provided clerical support to the entire staff. Valerie Njie conceptualized the program and acted as project coordinator and recruiter.

This report is useful to adults who need to improve basic math, reading and science skills in order to gain entry into and complete a science related training program like chemical laboratory technologist, pharmacy technician, nursing, etc. The report is useful to institutions or agencies conducting training programs which require a higher degree of math and science skills. It is useful to ABE/GED programs that have students who are interested in future entry into science or health related training programs. J.T.P.A., Labor and Industry, or other funding institutions that tract employment trends and have a need to prepare individuals for tomorrow's technological careers would also find the report useful. Corporations that need to upgrade their existing work force for tomorrow's hi-tech positions may also find the materials of use.

Permanent copies of the report will be on file for five years at the following:

Pennsylvania Department of Education
Division of Adult Basic and Literacy Programs
333 Market Street, 12th Floor
Harrisburg, PA 17126-0333

AdvancE
Pennsylvania Department of Education
Resource Center
333 Market Street
Harrisburg, PA 17126-0333

B. BODY OF THE REPORT

1. Statement of Problem

Despite employment growth in Western Pennsylvania in recent years, many remain unemployed, due to a lack of or insufficient skills. The types of jobs that are available tend to be so technical in nature that they require specialized training or a strong background in math and science. Since these types of positions are available and increasing, this dilemma must be addressed; be it by public school districts, training agencies, institutions of higher education or corporations.

Over the past 25 years, Bidwell has developed vocational training programs for disadvantaged/dislocated adults. In recent years, our course offerings, like the regions employment has shifted from vocational trades, to computerized and more recently science/technical related course offerings. While we were able to use reading, math and typing skill levels as criteria for acceptance in the past, the newer training programs require other indicators of success to be measured in advance. Our experience with the chemical laboratory technologist program has

proven that individuals scoring high on the reading and math entrance test are not necessarily equipped to tackle today's high tech training programs.

Major chemical companies in collaboration with Bidwell Training Center, Inc. developed a Chemical Laboratory Technologist program, designed to prepare graduates for employment in a wide variety of chemical laboratory settings. Simultaneously, the Pharmacy Technician Program at Bidwell was also experiencing difficulty with students who tested well in basic math and reading skills, but who had difficulty applying the math to scientific/chemical concepts. The goal of the program was to create a pool of candidates who could become qualified to enroll in science related training programs, at Bidwell and elsewhere. Ultimately, it is our hope that they will complete vocational training and secure employment. The project is geared to improve those basic math, science and observation skills necessary to take advantage of the increasing number of technical and science related training programs and positions in the region.

2. Objectives

a) To provide basic skills instruction in math, science and reading that will successfully prepare 40 students for enrollment in the chemical laboratory technologist, pharmacy technician or other science related training programs.

b) To initiate a linkage between applied math and physical sciences. To provide instruction and exercises in basic arithmetic, simple equations and inequalities.

c) To introduce the world of work, safety and precision standards that are paramount in the chemical industry.

d) To introduce basic reading instruction strategies in the contents, specifically in math and science with emphasis on application analysis and evaluation comprehension skills.

e) To introduce techniques of note-taking styles with emphasis on getting the main ideas and spelling.

f) To provide personal and academic counseling, career development and employability skills.

g) 80% Program completion.

h) 60% Placement into training.

3. Procedures:

The instructors had a series of meetings with the chemical laboratory technologist instructor to ascertain skills pertinent to successful completion of a science related training program. We discussed problems that formerly plagued and impeded one's successful completion of the chemical laboratory program and missed employment opportunities. The result of those meetings was the development of a generic program designed to prepare adults at various academic levels to take advantage of vocational training opportunities in science related fields. When the pharmacy technician program resumed, a similar process was conducted with the medical director since it required similar prerequisite skills.

The program consisted of reading and note-taking instruction, applied basic mathematics, universal analytical physical concepts, counseling and world of work skills. The curriculum was offered to 33 students whose reading and mathematical skills were between the seventh and twelfth grade level at the time of application for vocational training.

The mathematics component included concepts of: fractions; exponents, logarithms; functional relationships between variable quantities (viz. algebra); graphical representations (of functional relationships); number handling and elementary probability as they relate to measurement qualities. The math component focused predominantly on applications of the concepts to "real life", rather than with abstract constructs.

The science component developed the analytical, cognitive process around introduction of the concept of "fundamental" quantities through which our senses apprehend and describe the physical universe. These fundamental quantities include concepts of: amount, length, mass, time, and temperature as "primary units"; and energy, force, pressure, volume, velocity and acceleration as "derived/secondary units". Analogy, audio/visual demonstration and interactive role-play were used to help students identify, integrate and realize symbolism.

The reading component included process readings for adults reading below the twelfth grade level; reading in the content area; studying and note-taking techniques; test-taking strategies; and vocabulary and word etymology techniques.

A major recruitment campaign began in January by taping radio shows and appearing on four local TV public service programs to announce the pre-math/science and chemical laboratory programs. Our strategy was to encourage men and especially women and minorities to take advantage of this opportunity to prepare themselves for future training and employment opportunities. People who lacked the science and math background but dreamed of taking advantage of new employment opportunities were encouraged to take a closer look at the program.

We simultaneously began contacting applicants who had failed the entry exams for enrollment into the chemical laboratory program since June 1992. Applicants testing for chem lab and later pharmacy technician training between February and May 1993 were given literature on the pre-math program and encouraged to enroll in classes. Applicants were informed that those successfully completing the pre-skills program and meeting all chem lab or pharm technical training requirements would receive preferred acceptance into the August, 1993 Chemical Laboratory Technologist or Pharmacy Technician programs.

Our recruitment effort continued through April via mass mailings to social service organizations, libraries, churches, unemployment offices and community businesses. We participated in several minority expo's, agency workshops and community forums.

Applicants were tested for training bi-weekly on Tuesday and Friday mornings. Anyone who received a 50% and above math score and 7.0 - 12.8

reading comprehension score on the Gates - MacGinite was eligible to begin training. Seven of the 33 participants passed the initial entry test but were directed to the program to take advantage of instruction that played a major factor in the drop-out rate of those who appeared capable in earlier classes. Students attended classes three to six hours daily. Classes were offered Monday thru Friday from 9:00 a.m. - 4:00 p.m. in basic reading, math, note-taking, chemistry and physics terminology and introduction to the lab. Our emphasis was on: safety, physical measurements, number handling, elementary statistical concepts as related to measurement and record keeping. Computerized instruction was also available.

Materials and handouts for each class were developed by the math, science and reading instructors. We also referred to a variety of books and AdvancE materials. Emphasis was placed on developing a curriculum that would stimulate the imagination, peak curiosity, and decrease math and science anxiety. Observation, analytical thinking and decision making techniques were the central theme of the project.

Students were monitored closely for improvement in reading, mastery of science and math concepts and comfort in science literature. Once sufficient growth had been recorded in those areas, students were referred for vocational testing. Upon reaching the required reading and math scores necessary to be considered for vocational training, student schedules changed to concentrate more on science concepts and literature. Those with financial needs however opted to

leave the program to work until vocational training began in August. Once students reached set goals, they were scheduled for interviews with the Chemical Laboratory or Pharmacy Technician Program Directors. Others were referred to programs of their choice elsewhere.

4. Positive Results

a) The program provided a vehicle for adults with marginal skills to prepare for entry into science related training programs.

b) Provided strong candidates who are equipped to compete in and complete a science related program.

c) Students were scheduled for math based on their initial math score. Students were trained to apply numbers to specific identified items. The factor method was used to provide a linkage between math and science.

d) Post-test scores reflected improvement in reading and math skills between one to five grade levels, making them eligible for vocational training.

e) Students received personal career and world of work counseling on an individual basis.

f) 33 - enrollments (83%)
6 - early separations (18%)
27 - completions (82%)
20 - accepted into training related programs (74%)
(14 chemical laboratory, 5 pharmacy tech, 1 nursing)
2 - hold status - continued academic instruction (7%)
4 - completed, not accepted into vocational programs (15%)
1 - entered computer training (4%)

g) Students were introduced to common elements, compounds, molecules, and more general chemical reactions.

h) Via classroom instruction, students were exposed to critical elements of safety, record keeping, and observation required in a chemical lab.

5. Limitations/Problems

a) Recruitment - Many adults have a tendency to wait until a few weeks prior to a vocational program's start date to apply and test for training. Those who could have benefitted from pre-math/science training most were unable or unwilling to enroll six months prior to vocational training. This on-going problem is extremely frustrating for applicants who are within reach, but have waited too long to improve scores as well as staff who are eager to fill up classes. An increasing number of applicants surfaced during the final weeks of instruction resulting in 33 of 40 planned enrollments.

b) Open - entry classes proved extremely challenging for instructors who had to integrate new students at various academic levels into their classrooms on a bi-weekly basis.

c) Laboratory space which could have enhanced the program tremendously was unavailable due to vocational scheduling.

d) Students who entered the program with a combination of low scores lacked the time needed to focus on improving both math and science. They were the ones who failed to improve scores sufficiently to enter vocational training.

e) Many students experienced serious financial problems which resulted in absenteeism or early separation prior to reaching their goals.

f) The 18% (6) dropout rate is attributed to child care, stress, health, and other social problems which typically affect our adult student population.

6. Evaluation

The program was evaluated based on the number of adults who enrolled, completed, and gained admission into a science related training program. While only (83%) of the planned adults enrolled, we experienced (82%) completion. Two participants are currently enrolled in ABE classes and hope to increase reading scores sufficiently to enroll in the chem lab program.

7. Dissemination

Dissemination of this report and a package of instructional materials will occur through AdvancE.

8. Summary and Conclusions

The Pre-Math Science Program for Chemical Laboratory Technologist was successful at meeting its goals and objectives. Students with a minimal background in science at varying academic levels were prepared for entry into a chem-lab or science related training program. They received the necessary integrated math/science, reading observation, discrimination and world of work skills to gain entry into and remain in a science related training program.

SCIENCE/MATH COMPONENT

GLORIA MUSKAT

INTRODUCTION

This course of study was developed to assist returning adult students in their preparation for success in a chemical laboratory or other science related training program. While many older students have completed high school, their knowledge and background in science is minimal to none. Further complicating this problem often is poor reading and math skills, anxiety, and apprehension as students seek to understand a new language, that of chemistry.

The overall goal of the math/science component was to introduce basic math as it applies to scientific concepts, without isolating facts. The comprehensive choice of subject matter, use of appropriate scientific terminology and emphasis on clarity of expression were used to stimulate imagination and curiosity and encourage students to ask thoughtful, pertinent questions.

On a daily basis, instruction centered around integrating reality with symbolism, emphasis on safety, handling of numbers, record keeping, problem solving and organization and completion of instructional handouts. Students were encouraged to work together to reinforce newly acquired skills. Newspapers, magazines, T.V. programs and articles were used to attract students attention. Students were instructed to not assume anything; plan ahead; understand what the question is asking; read all choices; and not get trapped by distraction.

Student progress was monitored by instructors on an on-going basis via assignments, teacher and student graded tests and participation in class. Staffings were conducted weekly to identify problems and discuss student progress.

OBJECTIVES

1. To teach math and science as an integrated subject.

2. To familiarize students with scientific concepts through association with familiar objects and experiences.

3. To distinguish scaler quantities (primary units; amount, length, mass, time, temperature) vs vector qualities (derived units; energy, force, volume, velocity).

4. To guide students in problem solving using an analytical step by step approach.

5. To overcome anxiety, fear and apprehension in students.

6. To integrate chemistry with living experiences.

7. To familiarize students with the use of charts, graphs and other reference tables.

8. To introduce difficult to comprehend theories used to describe the physical world.

DEMONSTRATIONS AND ACTIVITIES USING HOUSEHOLD SUPPLIES

1. Measuring notebook using inches and metric units.

2. Measuring the room calculate area use significant figures.

3. Describe the making of a thermometer and its calibration using fahrenheit and celsius.

4. Law of magnets show how they attract and repel

5. Static electricity - rub comb pick up tiny pieces of paper.

6. Use yeast and sugar to produce CO_2

7. Study of taste buds on the tongue - use sugar for sweet,instant coffee, powder for bitter, salt for salt, lemon juice acid.

8. Surface tension - put toothpicks on water so they will float. Sprinkle powdered soap in one container and liquid detergent in another and compare.

9. Cabbage juice indicators - boil red cabbage leaves in water, separate into test tubes - add vinegar, soapy water, baking soda, lemon juice - compare colors - tell whether acid or a base - give cabbage leaves to students so that they can try this at home.

10. Use universal indicator tape to test Ph of soda pop and other liquids.

11. Trip to Carnegie Science Center to view liquid nitrogen demonstration and matter - energy work show.

12. Study a burning candle - Michael Faraday Book "Chemical History of a Burning Candle".

13. Crystal structure of sucrose (table sugar vs. table salt).

14. Study concentrations of solutions using Kool-Aid powder.

15. The contents of pencil - graphite, wood, clay not lead relate to misnomers.

16. Ice cubes floating on water - the nature of a water molecule.

17. Use rubbing alcohol vs. water to remove ball point ink stains.

18. Study evaporation of rubbing alcohol vs. water and cooling affect.

19. Stainless steel - plastic vs. silver plated teaspoons in hot water as heat conductors.

20. Song - The "Elements" by Tom Lehrer.

21. Relate alphabet letters to words, elements and compounds.

22. Separate mixture of salt and pepper using tweezers.

23. Make rock candy with concentrated sugar solution.

24. Discuss candy making - sugar molecule.

25. Read and discuss contents of shampoo.

26. Analyze the nutrient value and calorie content of various menus.

27. Discuss chemistry of everyday activities i.e., cooking, doing laundry, cleaning the home, gardening, hydroponics, growing plants in water vs. soil.

28. Make a wet cell - place scrubbed metals inside a lemon so that they touch the juice. Place on tongue, notice a tingle.

29. Digestion of starch cracker in the mouth - test with iodine get blue black.

30. Use schemes to help students memory examples: SHNOPS - Sulfur, phosphorous - s.p. Cohn cafe sulphur, carbon oxygen, hydrogen, nitrogen.

31. Use marshmallows and gumdrops to make molecules.

32. Read magazine articles aloud to encourage listening for details, suggest they practice at home.

33. Test sense of smell - vinegar, orange juice, ammonia, water, hold nose, compare.

34. Wacky cake baking - a cake mixed in a plastic bag instead of a bowl.

1½ cups of flour
1 cup sugar
1 tsp. salt
1 tsp. baking soda
5 tb. cocoa

Place above in baking pan, add 1 tsp. vinegar, 1 tsp vanilla extract, 5 tb salad oil, then one cup water. Stir until completely blended, bake at 350°F for 20 - 25 min.

35. Discuss lavoisier experiment with a mouse - supplying oxygen from heating mercuric oxide.
Hgo_2 -------> $Hg + 0_2$

36. Physical change, chalk dust powder tearing paper ice melting

37. Chemical change, rust, iron baking soda & vinegar -----> $C0_2$.

38. Distribute Nutrition News free from Allegheny County Health Department (412) 355-5800

39. Vitamin and mineral charts from Giant Eagle Supermarket

40. Scientific Method, Higgenbottom
Mystery who done it.
Lavoisier - mouse mercuric oxide.

41. Prefixes, suffixes, roots pluralization, English, Greek, Latin
Metric System and conversions, basic math, addition, subtraction, multiplication, division.
Basic chemistry, ions, monat, polyal.

INSTRUCTIONAL MATERIALS

Christ, Henry R. Building Power in Reading
An Amsco Publishing Company, NY, N.Y. 1992

Ellis, Dave Becoming A Master Student
College Survival Inc. Rapid City, S.D. 1992

Rugglero, Vincent. Critical Thinking,
College Survival Inc., Rapid City, S.D. 1992

Vacca, Richard. Vacca, Joanne. Content Area Reading.
Scott - Foresman & Company
Glenview, Ill. 1989

REFERENCE MATERIALS

The Write Stuff Life Skill Writing
Contemporary Books Inc.

Employment - Career
Getting Hired & Finding Job Opportunities
Fearny Janus/ Quercus Pub.

Contemporary Books
You're Hired Book 1 & 2
Charting Your Career Path
Getting the Right Job

Work - Wise Tactics for Job Success

Life Skills Reading
Scott Foresman and Company, Primary text
Henry I. Christ NY, N.Y. 10013 1992

Ready to Work - Winning at the Job Game
Contemporary Books

SCIENCE VOCABULARY

Solid
Liquid
Gas
Plasma
States of matter
Vacuum
Temperature
Celsius
Centigrade
Fahrenheit
Oxidation
Burning
Exothermic
Heat
Endothermic
Calories
B.T.U.
Methane
Activation Energy
Rate of Reaction
Catalysts
Equilibrium
Reduction
Simultaneously
Oxidation Number
solution
Dissolve
Solute
Litmus
Hydrochloric Acid
Sulfuric Acid
Nitric Acid
Carbonic Acid
Carbonated
Dissociate
Base
Hydroxide
Sodium hydroxide
Diatomic
Triatomic
Ozone

Coefficient
Balanced Equation
Composition
Decomposition
Mercuric Oxide
Precipitate
Symbol
Electrolysis of Water
Carbon Dioxide
Quantity
Quality
Valence
Compound
Mixture
Chemistry
Chyme
Periodic Chart of Elements
Matter
Atoms
Nucleus
Protons
Electrons
Neutrons
Orbit
Charge
Repel
Attract
Configuration
Component
Mass
Atomic Number
Atomic Mass
Hydrogen
Helium
Momentum
Theory
Energy
Energy Shells
Theoretically
Elements
Periodic Table

Chemical Activity
Columns
Rows
Symbol
Electron Distribution
Families of Elements
Noble Gases
Halide Family
Rare-earth elements
Artificially Produced elements
Lanthanide Series
Measurement
Length
Time
Inert Gas
Noble Gases
Hydrogen
Helium
Lithium
Carbon
Neon
Argon
Metals
Non-Metals
Salt Nacl
Atomic Mass Units
Isotopes
Molecular Weight
Formula Weight
Reactants
Products
Equation-Chemical
Conservation of Mass
Proportion
Mole
Avogadro's Number
Gram
Neutralization
Acid
Base
Ph
Aluminum Oxide
English system
Metric System
Units

Meter
Foot
Centimeter
Inch
Yard
Decimals in metric system
Conversions
Mass
Weight
Kilogram
Pound
Wacky cake-acids & bases
Aqueous
Neutral - Ph
Potassium Hydroxide
Salt - Product of Neutralization
Xenon
Radon
Wave
Ion
Ionic Bond
Covalent
Molecule
Electrically Neutral
Stable Molecule
bond
Crystalline
Transfer of electrons
Ionic bonding
Constituent
Molecular Structure of water
Outer - Shell
Covalent
Hydrogen bond
Metallic bond
Law of conservation
Matter and energy
Synthetic
Scientific method
Electromagnetic spectrum
Fahrenheit
Celsius
Naming acids

COMMON COMPOUNDS

Silcon dioxide - Sand
Methane - Natural Gas
Mercuric Oxide
Glucose
Fructose
Galactose
Alloys of Copper
Bronze Brass

Tin, Lead Iron, alloys (too soft, pure therefore mixed)

HISTORY OF PERIODIC TABLE

An introduction was made to the historical development to the periodic table of the elements from the time of John Newlds, English chemist, to Dmitri Medeleer to modern periotic table. Different versions of the table were distributed and explained

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Peter E. Demmin 1989

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Raymond Chang
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N.Y. 1991

Preparations for High School Equivalency in Science
Philip J. Gearing
General Education Series
Steck - Vaughn Company.
Austin, Texas
Section III Chemistry, pp 68-88
Lesson 32 Atoms
33 Electronic Structure of the Atom
34 Molecules and chemical bonds
35 Atomic Mass Mole
36 Balancing Chemical Equations

Energy and Chemical Reductions
Oxidation and Reduction
Acids and Bases
The Periodic table I
The Periodic Table II

Physics
Measurement
Temperature and Heat
Radioactivity

Tests I Molecules of the Living system
IX Air and Water Pollution, Ozone
X Helium - Hydrogen and the Sun
XIV Mixture of Metals
XV Carbon Compounds
XVI Radiation
XVII Electromagnetic Spectrum
XIX Fission - Fusion Nuclear Reactions

Science Workshop Series
Physical Science
Matter and Energy with an Introduction to Scientific Method
Seymour Rosen
Globe Book Company.
Simon & Schuster
Englewood Cliffs, N.J., 1992
pp 1-108
Pictures - Charts to fill in
Student summaries

Solving Problems in Chemistry
Richard G. Smith
Columbus Ohio, 1990
Merrill Publishing Company
Chapter 1-5 a few 6-13
Chapter 28
Appendix A-1
A-2
A-3
A-6
A-7
A-9

EXTRA BOOKS

The World of Carbon
Isaac A. Simon
Ablelard - Schuma Publishing Company, 1958

Giant Molecules Life Science Library
Herman F. Mark, 1966

Molasses - In the Beginning
American Molasses Company
Story of Sugar Refining

Organic Chemistry
Second Edition
T.W. Graham Solomons
John Wiley & Sons
N.Y., 1980

On Food and Cooking
Harold McGee
Charles Scribner's Sons
N.Y., 1984
Chapter 13
The Four Basic Food Molecules
pp. 577-597

A Chemistry Primer Atoms, Molecules, Energy Phases of Matter
pp. 625-638

Working with Numbers - Algebra
James T. Shea
Steck - Vaughn
Austin, Texas, 1990

Chemistry - Reading and Interpreting
Contents of Bottle of Shampoo label

Contemporary's GED Preparation for The High School Equivalency Examination

Science New GED test 3
Robert Mitchell, 1992
Chapter 8 Chemistry pp. 184-220
Chapter 9 pp. 238-241
Light Nuclear Energy
Westinghouse Electric Corporation, 1979

Physical Science, Scott Foresman
Dr. Timothy M. Cooney, 1990
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Unit II Chapter 5, 6, 7, 8
Unit III Chapter 9, 10, 11, 12

Periodic Table of the Elements
Published by the U.S. Navy 1984

Periodic Table of the Elements
Miles Inc., 1977

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American National Metric Council
Washington, D.C.

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pp.68 Atoms, Molecules and Ions
table 2.3

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Water - Line and Circle
pp.16 Ball and Stick
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Allyn And Bacon Inc. 1984

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Esso Research and Engineering Company
P.O. box 45, Linden, N.J.

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Nancy F. Knapp
Contemporary Books 1989

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with introduction to science method
Globe Book Company
Seymour Rosen
Englewood Cliffs, N.J. 07632
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Austin, Texas

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Chapter 184 - 220

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Merrill Science Program

Fundamentals of Mathematics
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Belmont, CA 1976

PRE-MATH/SCIENCE PROGRAM FOR
CHEMICAL LABORATORY TECHNOLOGIST

READING COMPONENT

Dr. Shirley Lewis

INTRODUCTION

This instructional reading design can assist adults in a pre-math/science class who have process reading information below the twelfth grade level on the Gates-MacGinite Reading Test. The sequence of combining whole group, small group and then individualized instruction occurs after a pre-test is given. The instructor assumes that self-assessment will illustrate the importance of accepting academic growth by utilizing various strategies.

Adults are not always successful at enhancing their achievement when taught by using identical instructional materials. Various settings can expose learners to differentiate which instructional techniques and materials can compensate for their weaknesses and augment their strengths. In the broadest sense, adult learners who begin to interact with instructional text in a consistent and varied manner will produce better retention of meaning.

First, whole class instruction translates new concepts to specific skills. Small group instruction can summarize how skills would apply to materials provided. The group determines which text to supplement their learning by using Group Analysis Assessment Summary. Finally, the adult selects the text of their choice and works individually. Questions are encouraged by the instructor to clarify any problems. Evaluation of errors are explained on a daily basis. The reading prescription and the student journal become the diagnostic instrument.

Between self-assessment and the instructor's evaluation materials are prescribed in terms of organizational structure. At this time, other strategies may be utilized. Some categories described in this course suggest effective materials.

GOALS

To prepare pre-math/science students to achieve the required score on the Gates Mac-Ginitie Reading Test.

To introduce basic reading instruction in the contents, specifically in math and science with emphasis on application, analysis, and evaluation comprehension skills.

To provide employability information related to job development through career counseling.

To introduce techniques of note-taking styles with emphasis on getting the main ideas and spelling.

OBJECTIVES

1) To differentiate reading comprehension strategies in the content areas using analysis, application and evaluation skills.

2) To develop contextual vocabulary techniques in addition to emphasizing word etymology.

3) To increase reading rates through experiencing various types of text.

4) To recognize and use textbook organizational strategies.

5) To develop a system of studying using different techniques according to individual learning styles.

6) To use self-assessment methods to monitor content area and employability skills.

7) To develop note-taking techniques with emphasis on spelling.

INSTRUCTIONAL PLANNING

Planning Calendar

Reading Prescription

PLANNING CALENDAR

The planning calendar was designed for the instructor to be used in several different ways. Traditionally, it can be utilized as a weekly or monthly lesson plan for the instructor. However, in the following example page, it is used to assign a series of weekly topics for students to select the skill areas which would accommodate their particular needs.

The number of topics on a daily or weekly basis can be determined by what the instructor feels they are able to effectively teach. The role of the teacher in this model changes when one individualizes. The teacher becomes an instructional monitor which is acceptable because new concepts have been previously introduced.

The Planning Calendar provides direction for the student's Individual Reading Prescription and permits the teacher to account for recording their progress.

PLANNING CALENDAR

Dr. Lewis

Date: Week of 5/25/93

Directions: Instructor states topic student selects text for that day.

Day			
1 _____ Day _____ Date	5/25 Reading skills pre-test (new) writing (voc. Dictation) Use of Reference Folder Content area - physics text & question		
2 _____ Day _____ Date	5/26 SRA - Aqua (1) Rate builder Spelling (Chemistry) (20) Describe Bloom's Levels of Questioning Do a self-assessment of your journal assign test-taking text		
3 _____ Day _____ Date	5/27 Levels of Questioning Spelling (20) Learning Styles SQ3R (study, question, read, recite, review-Poem) SRA Aqua (1) Rate Builder		
4 _____ Day _____ Date	5/28 Poetry (oral & interpretation) Spelling - Chemistry - 20 words SRA - Aqua (1) Rate Builder writing assessment - note-taking a book study skills - ready set study		
5 _____ Day _____ Date	5/31 Select a vocabulary text using - context clues - key words - word mapping - categoring - affixes		
6 _____ Day _____ Date	6/1 Pre-test for: Comprehension - Note-taking Vocabulary - Study Skills Employability - Journaling		
7 _____ Day _____ Date	6/2 Do any assignment for: - Outlining - Reference skills - Body English - Poetry or play - Etymology - Listening skills		

READING PRESCRIPTION

The Reading Prescription is the most important part of this individualized program. It is a diagnostic instrument because each student's prescription depends upon the results of the Gates-MacGinite Test, Reading and Writing Analysis, class summary and class work.

After an analysis of each item, students are prescribed assignments in their areas of remediation for each skill. They may select any relevant text as listed in the instruction strategies and materials section of this document since each textbook or kit supplement the other.

The instructor makes suggestions and monitors their progress on a daily basis. Students generally are asked to select at least one assignment for each area, although this varies. The Reading Prescription may also be used by the instructor to categorize available material or designate what should be used on a daily or weekly basis. This eliminates students selecting the same academic area repeatedly.

(See chart #2)
(Reading Prescription)

INSTRUCTIONAL STRATEGIES AND MATERIALS

EXPLANATION OF STRATEGIES

A. Self-Question Strategy
Ask yourself questions as you read to help you keep track of what you are reading. (Henk, 1969).

Kinds of Questions

1. Literal or detail questions
2. Higher level thinking questions

Inference	Comparison contrast
Cause & effect	Character traits
Evaluation	Predicting outcomes
Fact or opinion	Drawing conclusions
Appreciations	Author's purpose
Reactions	Identification

3. Waste of time questions (w.o.t.)
4. What I learned Questions (C.I.A.)

B. Summary Chart of Question Types
Knowledge
Comprehension
Application
Analysis
Synthesis
Evaluations

Higher Cognitive Questioning Handbook
Education Service, 1971

"How To Get A Better Question"
Major Categories of Cognitive Domain
(Bloom, 1987)

Cooperative Learning
Teacher assumes the role of mediator and permits students to question each other. (Childhood Education, 1990)

"Recovery and Structure"
Examine the relationship between grammatical structure and reading skills.
(The Reading Teacher, 1971)

"Metacognition" - Ann Brown, 1981
-Examine the relationship between cognition and knowledge

"Self - Questioning Routine"
-Teach student how to question relevant to text.

"Reciprocal Question"
-Teach students to ask each other

"Book Reporting Alternative"
-List of 80 alternatives
Library Media Services, 1988

"Reciprocal Learning "Steps"
1. Read part of a story
2. Ask questions
3. Summarize
4. Clarify
5. Predict what might happen

-Carole A. Ellis
Chambersburg, PA. 17201

"Request Procedure" (Reciprocal Question)
1. Teacher and student have list of questions
2. Silent reading of first sentence
3. Students ask teacher a question
4. Teacher ask student a question

Journal of Reading, 1969

"Thinking Styles: Keys to Understanding Student Performance"
-Phi Delta Kappan, 1990

Word Etymology - (Vocabulary Development Strategies)

1. Miscue Analysis
2. Close Procedure
3. Self-Questioning Strategy
4. Affixes
5. Words in context (Context Analysis)
6. Reference (dictionary thesaurus etc.)
7. Word Mapping

VOCABULARY

RSVP
Reading Spelling Vocabulary Pronunciation with Etymology
Norman Lewis
Ammsco School Publications Inc.

EDL Core Vocabularies
Science, Reading, Mathematics
Social Studies

Chemistry
McGraw - Hill Inc.

Vocabulary Connections - Level H
A Content Area Approach
Steck - Vaughn Company.

Reading Improvement Activities Books 2 & 3
Steck - Vaughn Company

Organic Chemistry
John Wiley & Sons

Using the Context Levels K - L
Barnell Loft. LTD.

(See chart #3a, b, c,)
(Phonetic Analysis)

(See chart #4)
(Reading Improvement Activities)

SOFTWARE

Mastering Spelling Skills Bank - Eleven Series
McGraw-Hill

Speed Reading Tutor IV
Kriya Systems Inc.
Simon & Schuster Software

Speed It
Davison & Associates Inc.

Word Attack
Davison & Associates Inc.

(See chart #5)
(Group Reading & Writing
Analysis - Class Summary)

COMPREHENSION

(See chart #6)
(Steps in SQ3R Method)

IMPROVING READING COMPREHENSION

1. Cooperative learning
2. Self-Assessment Reading Study Skills
3. Miscue Analysis
4. Recovery of Deep Structure
   (Meaning and Structure)
   (Grammatical, Semantical, Syntactical)
   (3 Sentences phrased differently)
5. Cloze Procedure
6. Request Procedure
7. Self-Questioning Strategy
8. Reciprocal Learning
9. Kinds of Questions
10. How to Ask Better Questions
11. Learning Style
12. Metacognition
13. Story Grammar
14. Question-Answer Relationships (QAR'S)
15. Semantic Mapping

ENHANCING READING RECALL

1. Cloze Procedure
2. Request Procedure
3. Self-Questioning Strategy
4. Reciprocal Learning
5. Kinds of Questions
6. Story Mapping
7. Semantic Mapping

(See chart #7, Questioning: Categories & Definitions)
(See chart #8, Seven Styles of Learning)

LEVELS OF QUESTIONING

1. Kinds of Questions
   a. Literal or detail
   b. Higher level thinking questions
   c. Waste of time questions (w.o.t)

2. How to Ask Better Questions

3. Summary Chart of Question types

COMPREHENSION

Multi level Learning Laboratories Inc.

Developing Reading Strategies
-Horizons Level
Steck - Vaughn Company

Life Skills: Reading and Writing for Comprehension
-Stone Fitzgerald Salo
Contemporary Publishing Company.

Challenger's 7 & 8 Adult Reading Series
Corea Murphy: New Readers Press

Best Short Stories - Middles Advance L.
Richard Harris Jamestown Publishing Company.

Building Power in Reading, Christ Henry R.
Ammsco School Publishing Company NY, N.Y.
Levels K - L
Getting the Facts
Finding the Main Idea
Drawing Inferences
Drawing Conclusions

Poetry
Scholastic Scope Magazine

Reading Skills For Adults
-Brown Book
Steck - Vaughn Adult Education.

TEXTBOOK READING STRATEGIES

1. Cooperative Learning
2. Interdisciplinary Curriculum
3. Miscue Analysis
4. Recovery of Deep Structure
5. Cloze Procedure
6. Request Procedure
7. Self-Questioning
8. Modeling Questioning Frame
   (Before, While, After Reading)
9. Reciprocal Learning
10. Kinds of Questions
11. How to Ask Better Questions
12. Book of Reporting
13. Learning Styles
14. Metacognition

CONTENT AREA

Life Skills Reading
Stone, Fitzgerald, Sako
Contemporary Books Publishing Company

Pre - GED Reading/Life & Literature
Pre - GED Social Studies
Pre - GED Science
Scott Foresman Publishing Company

*Reading in Content Area-Science
Jamestown Publishing Company.

How To Get The Most Out of Your Textbook.
Association of American Publishers

(See chart #9a, 9b Summary of Rules)

NOTE-TAKING

Note-taking Activities with an emphasis on Science

DIRECTIONS: Select a note-taking activity for your reading prescription. Write and spell number word by dictation, dictate the elements on Periodic Table, write formulas using words only.

Write a word problem using words only. Describe how to solve a problem in sequential steps. In paragraph form describe your math or science class.

In paragraph form describe your area of strengths and weakness. How do you feel about the purpose of the Pre-Math Science Program? What objective changes would you make? Describe the type of Chemical Lab Technician that impresses you? (Use Occupational Directory). Locate words using affixes and relate them to Chemistry by using the words in a sentence.

OUTLINE: Outline a pamphlet in the bookcase
Write only important facts by using a formal outline, mapping diagramming or your own style.

Design a prescription by the title of a book and pages.

EMPLOYABILITY

Directions: Select an employability term and complete the area you need.

CAREER COUNSELING

Educational Design, 1992

Getting A Job

1. Preparation for the Job Search
2. Interview Skills
3. More Interview Skills
4. Activity: Situation for Discussion

Survival Skills for the World of Work

5. The Rules of the Game
6. Moving Up or Out
7. Critical - Incidents On - the - Job
8. More Critical - Incidents

New on the Job

1. Fitting In
2. Asking Questions and Getting help

Dealing with Co - Workers

3. Good Co-Workers
4. Too Much Talk

Getting Fired

5. The Magic Words
6. Don't Blow Your Cool

Excuses

7. The Right Kind and the Wrong Kind

EMPLOYABILITY

Employment Skills Lab
Walsh Publishing Company

Work - Wise Tactics for Success
Contemporary Books Publishing Company

Practicing Occupational Reading Skills
Steck - Vaughn Pub.

Ready To Work
Winning at the Job Game
Contemporary

English for Employment
Larry Parsky
Educational Design Inc.

Body English A study of Gestures
Thomas W. Adams
Scott, Foresman & Co.

Forms
Nancy Anderton
Fearon/Janus/Quercus

EVALUATION

Standardize test measure knowledge and abilities that contribute to academic achievement, such as the Gates-MacGinite Reading Test. For class instruction, I used pre-test, post-test, embedded test from the various texts. Also used was a new evaluation called Authentic Assessment which evaluates all reading, writing, speaking and listening skills to individualize instruction. The following inventories list those skills using a non-graded system.

(See chart #10, Testing Scores)

STATAGIES FOR TECHNICAL MATERIALS

1. Cooperative Learning
2. Interdisciplinary Curriculum
3. Close Procedure
4. Request Procedure
5. Self-Questioning Strategy
6. Kinds of Questions
7. How to Ask Better Questions
8. Learning Styles

NOTE-TAKING

The Write Stuff, Life Skill Writing
Contemporary Books Inc.

Pre-Ged Writing
Steck-Vaughn Company

Spelling: A Mnemonic Approach
South-Western Publishing Company

RSVP - Book 3
Reading Spelling Vocabulary
Pronunciation with Etymology
Amsco School Publication Inc.

STUDY SKILLS

Ready, Set, Study
Improving your Study Skills
-Wendy King
Jamestown Publishers

Building Your Study Skills
Susan Echaoke - Yoon
Contemporary Publishing Company.

Test-Taking Strategies (Mort Herold)
Note-taking Made Easy Mort Herald
Judi Kesselman & Franklin Peterson
Contemporary Books Inc.

TEXT BOOK EVALUATION

(See chart #11, Fry Readability Graph)

STUDENT REFERENCE FOLDER

STUDENT REFERENCE FOLDER

Reference information is critical for any form of educational endeavor. Since many of the adult learners were without dictionaries, a reference folder was compiled for everyone after each content area was taught. The following information is included in each students referecne folder:

Self-Assessment

- Reading Study Skills Inventory
- Test-Taking Inventory
- Seven Styles of Learning
- Test-Taking Skills
- Educated Guessing - Section from "Where There's A Will There's An "A".

Vocabulary

- "Glossary of Building block" - Affixes and Roots
- Phonetic, Syllabication, Visual Accents, Structural Analysis Principles
- Basic 1100 Word Vocabulary
- Chemical Glossary - Chemistry, Chang Pre-GED Science Vocabulary-Scott-Foresman.

Comprehension

- Paragraph Comprehension and Word Knowledge Review - ASVAB Test
- Bloom's Questioning: Categories and Definitions
- Steps in SQ3R Method - Francis Robinson Reading Flexibility

Content Area

- How To Get The Most Out of Your Textbook - AAP Student Services
- Glossary of Business Terms - Steck Vaughn Co.
- Conversion Tables - Chemistry, Chang

Note - taking

- "Master List of Frequently Misspelled words" - GED Official Teacher's Guide - A Summary of Grammatical Rules - Note -taking Made Easy.

- Fry Readability Formula

Chart #1

PLANNING CALENDAR

Dr. Lewis

Date: Week of 0/00/00

Directions: Instructor states topic student selects text for that day.

Day			
1 Day Date			
2 Day Date			
3 Day Date			
4 Day Date			
5 Day Date			
6 Day Date			
7 Day Date			

Chart #2

READING PRESCRIPTION

Name Dr. Shirley Lewis *Date* June 25, 1993

EMPLOYMENT LAB Employment Reading Skills Lab
Employability Workbooks - 4th shelf

COMPUTER ROOM Word Attack, Spell It, English Vocabulary

WORKBOOK Building Power in Reading - Amsco

Getting the Facts - K Barnell Loft

GED & Pre - GED Critical Reading

VOCABULARY TEXT RSVP with Etymology - Norman Lewis

Reading Improvement Activities - Book 2 or 3

Spelling Amnemonics Approach - Alvin R. Brown

Using the context - Barnell Loft BK. L&K

STUDY SKILLS All Spelled Out - D Contemporary's

Ready Set-Study

Pre-GED Reading Skills for Social Studies and Science

READING IN THE CONTENT AREA

Reading in the Content Fields - Science Jamestown Pub.

Copies of GED or Pre-GED Workbooks pages.

PHONETIC ANALYSIS

VOWEL PRINCIPLES

1. If there is only one vowel in a word, that letter usually stands for the short sound. If the vowel letter comes at the end of a word, that vowel is usually long.

   Examples: not go

2. If there are two vowel letters in a word, one of which is final"e" usually the first vowel letter has its long sound and the final "e" is silent.

   Examples: smile huge

3. If there are two vowel letters together in a word, usually the first vowel letter has its long sound, the second is silent.

   Examples" road hay

4. If the only vowel letter in a word is followed by "r", the sound of the vowel is usually neither long nor short but controlled by the "r".

   Examples: Bird arm

5. If the syllable ends in a vowel, it is called an open syllable. The vowel at the end is usually long, if the syllable is accented.

   Example: table

6. A closed syllable is one which ends in a consonant. The single vowel in syllable is usually short, if the syllable is accented.

   Example: bat-tle

SYLLABICATION PRINCIPLES

1. If there are two consonants between two vowel letters in a word, the first syllable usually ends with the first of the two consonants.

   Examples: pret-ty can-dy pen-cil

2. If the last syllable of a word ends in "le", the consonant preceding the "le" begins the last syllable.

   Examples: sim-ple ram-ble

3. If the final vowel letter in a word is followed by a single consonant, that consonant usually begins the second syllable.

   Examples: ho-tel na-tive

4. When the first vowel is followed by a blend, the blend often begins the second syllable.

   Examples: cy-clone se-cret

5. When the first vowel is followed by a consonant plus a blend, the first syllable usually ends with the first consonant and the blend begins the second syllable.

   Examples: chil-dren con-trol

6. Refer to number 5 and 6 of the vowel principles for audiroty aids to syllabication of accented syllables.

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VISUAL CLUES TO ACCENT

Clues to an accented final syllable in a two-syllable root word:

1. As in re tain (ri tan): two vowels together
2. As in for gave (for gav): two vowel letters, one of which is final"e"
3. As in com pelling (kem pel ling): two like consonant letters before an ending or suffix.

Clues to an accented first syllable in a two-syllable root word:

1. As in pen-nent (pen ant): two like consonant letters following the first vowel letter.
2. As in pock-et (pah et): the letters ch preceded by a single vowel letter.
3. As in hur-dle (her dal): a final syllable ending in le preceded by a consanant.

Clues that must be checked by context:

1. As in con fid ing (kin-fid-ing) or as in pi lot ing (pi-lit-ing): a single consonant letter following a single vowel letter before an ending or suffix may be a clue to either an accented first syllable.

STRUCTURAL ANALYSIS

Common Prefixes and Suffixes to Aid in Word Attack and Vocabulary Development.

I. Definitions

A. Stem or root of a word: That part of a word that gives the thought of the word. For instance, in the word marina, the stem is mar- from the Latin word mare, meaning sea. Thus marina means pertaining to the sea. The stem of the word dictate is dict- meaning speak or say, a stem which we find also in such words as predict, to say before or foretell, contradict, to say against or oppose.

B. Prefix: A prefix is a syllable or first element of a word placed before the stem or word, which significantly changes the meaning of the word. For instance, in the word take, if we add the prefix mis, the meaning becomes to make an error. If we add the prefix un, which means not to the word happy, we get the opposite meaning, unhappy, which obviously means not gay.

C. Suffix: A suffix is a syllable added to the end of a word to modify its meaning or change the part of speech. Examples of these are: improve, meaning to make better; adding the suffix ment, we get improvement, which is a noun that means a better condition. Again, if we add the suffix less, to the word harm, which means to hurt or injure, we get the word harmless, which means free from hurt or injury.
NOTE: If words end in t or an e, that letter is dropped when a suffix is added.
Examples: invent - invention

II. COMMON PRINCIPLES

Prefix	Use
a -, ab-, away, from	ab-sent, ab-normal
ad-, ae, ad-, etc., to, at	ad-here, ac-cept
ante-, before	ante-dote
anti-, ant-, against	anti-slavery, anti-septic
auto-, self	auto-mobile, auto-graph
bi-, two	bi-sect
circum-, around	circum-ference
con-, col-, com-, co-, cor-, with together	con-nect, co-operate

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de-, away from, from, down	de-tach, de-send, de-pend
equip-, not, removal or separation from	dis-agree, dis-locate
equip-, equal	equip-distant
ex-, ec-, e-, out, from	ex-cept, ec-centric, e-volve
in-, il-, im, ir-, on-, etc., in, on; also, not, un-	indorse, in-clude, il-legal
inter-, between	inter-cede
mis-, wrong	misspell
non-, mono-, one, alone	mono-tone
per-, through	per-forate
post-,after, behind	post-pone, post-script
pre-, before	pre-pare, pre-cede
pro-, before, for	pro-vide, pro-pose
re-, rad-, back, again	re-gain, read
sub-, suc-, suf-, sug-, sum-, sup-, under	subject, suf-fer, sup-port
trans-, across	trans-fer, trans-port
un-, not	in-kind
uni-, one	uni-form

III. Common Suffixes

Suffix	Use
-able, -ible, capable of being	measur-able
-age, amount, state	mile-age, cour-age
-ance, -ence, relation to, condition of	appear-ance, independ-ance
-ar, -ary, relating to	muscular, pulmon-ary
-ate, to act, to curse	anim-ate
-action, condition	degener-ation, vari-ation
-cy, quality, state	pira-cy
-ful, containing, characterized by	care-ful, faith-ful
-fy, to make	satis-fy
-is, -ical, pertaining to, like	class-ic, geometr-ical
-ion, action, being	rebel-ion, miss-ion
-ious, full of	relig-ious
-ish, like, having the traits of	blu-ish, self-ish
-ize, -ise, to make like, affect with	pulver-ize
-less, without, free from	color-less-, care-less
-ly, like, in a specified manner or degree	accidental-ly, rapid-ly
-ment, resulting state of being	astonish-ment
-ness, quality or state of being	careless-ness
-ous, full of, of the nature	peril-ous
-tion, result or product of an act	crea-tion
-ty, condition or character	puri-ty
-ure, denoting action; state of, or result of action	depart-ure

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Chart #4

Reading Improvement Activities

VOCABULARY BOOK 2

Notes	Skill	Pages	Items	Score
_____	Affixes	89-96	39	_____
_____	Word Differences	100-102	50	_____
_____	Meanings	A B 103 - 106	50	_____
_____		C D 106 - 109	50	_____
_____		E F 109 - 111	45	_____

VOCABULARY BOOK 3

Skill	Pages	Items	Score
_____ Affixes (Read)	88		_____
_____ Definitions (Reciprocal Learning)	89 - 91	44	_____
_____ Relationships	100 - 102	40	_____
_____ Word Differences	97 - 99	50	_____
_____ Meanings	A B 103 106	50	_____
_____	C D 109 112	50	_____
_____	E F 112 113	25	_____

GROUP READING AND WRITING ANALYSIS - CLASS SUMMARY

Date _____ Period _____ Instructor _____

NAME	**WORD ATTACK** Pronunciation Syllabication Sight vocabulary Prefixes - suffixes - roots	**VOCABULARY** Using Key Words Glossary Context Clues Definitions	**COMPREHENSION** Main Idea Details Sequence Figurative Language Facts and Opinions Cause and Effect	**WRITING** Note Taking Skills Spelling Skills Using Scientific Vocabulary	**CONTENT SKILL AREAS** Using the textbook Using resource materials (i.e. pamphlets) Using reference materials	**SKILL AREAS** Application Analysis Synthesis Evaluation

Chart #5

STEPS IN SQ3R METHOD

Chart #6

The title for this new higher-level study skill is abbreviated in the current fashion to make it easier to remember and to make reference to it more simple. The symbols Survey Q3R stand for the steps which the student follows in using the method; a description of each of these steps is given below:

SURVEY 1. Glance over the headings in the chapter to see the main points which will be developed. Also read the final summary paragraph if the chapter has one. This survey should not take more than a minute and will show the three to six core ideas around which the discussion will cluster. This orientation will help you organize the ideas as you read them later.

QUESTION 2. Now begin to work. Turn the first heading into a question. This will arouse your curiosity and so increase comprehension. It will bring to mind information already known, thus helping you to understand that section more quickly. And the question will make important points stand out while explanatory detail is recognized as such. Turning a heading, but it demands a conscious effort on the part of the reader to make this a query for which he must read to find the answer.

READ 3. Read to answer that question, i.e., to the end of the first headed section. This is not a passive plodding along each line, but an active search for the answer.

RECITE 4. Having read the first section, look away from the book and try briefly to recite the answer to your question. Use your own words and include an example. If you can do this you know what is in the book; if you can't, glance over the section again. An excellent way to do this reciting from memory is to jot down cue phrases in outline form on a sheet of paper. Make these notes very brief:

> Now repeat steps 2,3, and 4 on each subsequent headed section. That is, turn the next heading into a question, read to answer that question, and recite the answer by jotting down cue phrases in your outline. Read in this way until the entire lesson is completed.

REVIEW 5. When the lesson has thus been completely read, look over your notes to get a bird's eye view of the points and their relationship and check your memory as to the content by reciting on the major sub-points under each heading. This checking of memory can be done by covering up the notes and trying to recall the main points. Then expose each major point and try to recall the subjoints listed under it.

Robinson, Francis P. Effective Reading. New York: Harper and Brothers, Publishers, 1962

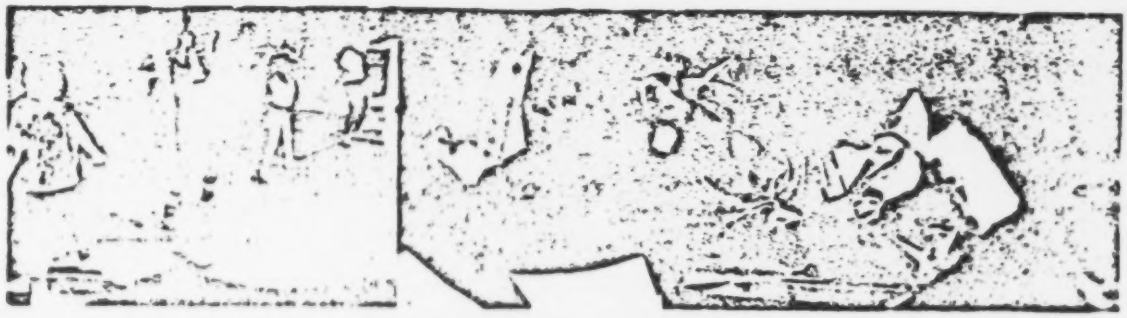
QUESTIONING: CATEGORIES AND DEFINITIONS

Questioning Category	Bloom's Category	Student Activity	Typical Definition Words
LOWER LEVEL	Knowledge	Remembering: facts, terms definitions, concepts, principles	What? List, name, define, describe
	Comprehension	Understanding the meaning of material	Explain, interpret, summerize, give examples, predict translate
	Application	Selecting a concept or skill and using it to solve a problem	Compute, solve, apply, modify, construct
	Analysis	Breaking material down into its parts and explaining the hierarchical relations	How does ___ apply Why does ___ work? How does ___ relate to ___? What distinctions can be made about ___?
HIGHER LEVEL	Synthesis	Producing original after having broken the material down into components	How does the data support ___? How would you design an experiment which investigates ___? What predictions can you make based upon the data?
	Evaluation	Making a judment based upon a previously established set of criteria	What judments can you make about ___? compare and contrast ___ with ___.

Chart #7

Chart #8

CLIP AND SAVE



SEVEN STYLES OF LEARNING

TYPE	LIKES TO	IS GOOD AT	LEARNS BEST BY
LINGUISTIC LEARNER *"The Word Player"*	read write tell stories	memorizing names, places, dates and trivia	saying, hearing and seeing words
LOGICAL/ MATHEMATICAL LEARNER *"The Questioner"*	do experiments figure things out work with numbers ask questions explore patterns and relationships	math reasoning logic problem solving	categorizing classifying working with abstract patterns/relationships
SPATIAL LEARNER *"The Visualizer"*	draw, build, design and create things daydream look at pictures/slides watch movies play with machines	imagining things sensing changes mazes/puzzles reading maps, charts	visualizing dreaming using the mind's eye working with colors/pictures
MUSICAL LEARNER *"The Music Lover"*	sing, hum tunes listen to music play an instrument respond to music	picking up sounds remembering melodies noticing pitches/rhythms keeping time	rhythm melody music
BODILY/KINESTHETIC LEARNER *"The Mover"*	move around touch and talk use body language	physical activities (sports/dance/acting) crafts	touching moving interacting with space processing knowledge through bodily sensations
INTERPERSONAL LEARNER *"The Socializer"*	have lots of friends talk to people join groups	understanding people leading others organizing communicating manipulating mediating conflicts	sharing comparing relating cooperating interviewing
INTRAPERSONAL LEARNER *"The Individual"*	work alone pursue own interests	understanding self focusing inward on feelings/dreams following instincts pursuing interests/goals being original	working alone individualized projects self-paced instruction having own space

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Capital Letters

Use a capital letter for:

1. The words I and O.
2. Each initial of a name.

Use a capital letter to begin:

1. The first word in every sentence.
2. Each important word in a proper noun that is the name of a particular person, pet, place, building, street, road, park, or organization.
3. Each name of a holiday.
4. The name of a day or a month but not of a season.
5. The first word and each important word in the title of a book, story, song,or poem.
6. A word referring to God or the Bible.
7. Each proper adjective.
8. Titles or abbreviations of titles used with names.
9. The name of a relative such Aunt or Father when it is used as a name or with a name.
10. Each line of poetry.
11. The first word in the closing of a letter.
12. The first word and each important word in the greeting of a letter.
13. The first word in the closing of a letter.
14. The first word of each topic in an outline.
15. The name of a race, nationality, religion, or a language.

Parts of Speech

1. An adjective is a word that is used to modify, or change the meaning of, a noun or a pronoun.
2. An adverb is a word that modifies a verb, an adjective, or another adverb. An adverb tells how, when, where, or how much.
3. A conjunction is a word that connects words or groups of words.
4. An interjection is a word that expresses strong feeling.
5. A noun is a word that names a person, a place, or a thing.
6. A preposition is a word that introduces a phrase and shows the relation between the principal word in the phrase and some other word in the sentence.
7. A pronoun is a word used in place of a noun.
8. A verb is a word that tells what action is done in a sentence, or a word like am, is, are or were that helps tell something about the subject. When the verb is expressed by two or more words, it is called a verb phrase.

Plurals of Nouns

1. Make most nouns plural by adding s to the singular form (cat, cats).
2. Most nouns ending in s, z, x ch, or sh are changed to plural by adding es (church, churches).
3. To form the plural of a noun ending in y after a consonant, change the y to i and add es (city, cities).
4. To form the plural of a noun ending in y after a vowel, add s (boy, boys).
5. Nouns ending in o after a vowel are changed to plural by adding s to the singular form (radio, radios).
6. Some nouns ending in o after a consonant are changed to plural by adding es to the singular (potato, potatoes). Some exceptions to this are altos,
7. Some nouns ending in f or fe are changed to plural by changing the f or fe to v and adding es (life, lives
8. A few nouns form the plural by changing the word (child, children).
9. A few nouns have the same form in the singular and the plural (sheep, sheep).

Possessives of Nouns

1. To form the possessive of a singular noun, add and apostrophe and s (girl, girl's).
2. To form the possessive of a plural noun ends in s, add an apostrophe only (boy, boys).
3. To form the possessive of plural noun that does not end in s, add an apostrophe and s (men, men's).

Punctuation

Use an apostrophe:

1. In a contraction where letters are left out.
2. With a noun to show possession.

Use a colon after the greeting of a business letter.

Use a comma:

1. To separate the name of a city and its state or country.
2. To separate the day of the month and year in a date.
3. To separate the name of a day and the name of a month.
4. To set of the name of a person spoken to from the rest of the sentence.
5. To set off the words yes and no in a sentence when they are used as part

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of an answer.

6. To separate each word or group of words in a series. a series is three or more words in a list.

7. After the closing of a letter.

8. After the greeting of a friendly letter.

9. To separate a direct quotation from the rest of the sentence.

10. To set off the first part of a sentence if the sentence begins with a conjunction such as if, when since, because, after, or before.

Use and exclamation point after an exclamatory sentence or after an interjection.

Use a period:

1. After a declarative or an imperative sentence.

2. After each initial and each abbreviation.

3. After each letter or number in an outline.

Use a question mark after an interrogative sentence.

Use quotation marks:

1. To enclose a direct quotation or each part of a divided quotation.

2. In a sentence, around the title of a story, poem, or song.

Underline the title of a book (except the Bible) or magazine when the title is used in a sentence.

Using the Right Word

A, an - Use a before a word beginning with a consonant sound; use an before a word beginning with a vowel sound.

Bring, take - Bring means to carry from a point away to a near point. Take means to carry from a near point farther away.

Brought, brung - Never use "brung or "brang" for brought.

Can, may - Use may to ask or give permission. Use can to show ability to do something.

Good, well - Use good to describe a person or thing, and well to tell how something is done.

Had ought - The word ought should never be used with had.

Hardly, scarcely - Do not use not or a contraction ending in n't with hardly, scarcely and other words meaning no.

Have, of - Never use of after could, should, would, might or ought to; use have instead.

Himself, herself, - themselves - Use himself or herself when you speak of one person; use themselves when you speak of more than one; never use "hisself" or "theirselves"

John he - A pronoun should never be used after the noun for which it stands.

Let, leave - Let means to permit or allow; leave means to give a thing up to go away form it.

Rise, raise - Use a form of rise to mean to go up, to get up,or to become higher. Use a form of raise to mean to lift up, to grow something, or to make something higher.

See, saw, seen - See, saw, and seen are forms of the same verb. See expresses present time and saw and seen express past time. These forms are called the principal parts of the verb.

Sit, set, - Sit means to rest or to stay in one place: set means to put or place a person or thing somewhere.

Teach, learn - Teach means to show how to do. Learn means to find out how to do.

There's theirs - There's is a contraction, a shortened form of two words with the omitted letters replaced by an apostrophe. Theirs is a possessive pronoun. Never use an apostrcphe in a possessive pronoun

This, that, these, those, them - Use them as a pronoun to stand for the names of persons and things. Use this and that as adjectives with singular nouns, and these and those with plural nouns.

This, here, that there - Here and there should never be used with this and that

To, too, two - Too means more than enough or also; two means the number 2; to is used with a verb to show action or with a noun to show where.

Ran, sank, drank, swan, began, saw, went, did, came, ate, took, rode, spoke, wrote, gave, chose, broke, stole, froze, rose, knew, grew, dew, tore, wore, blew, drew, and threw, are used alone without helping words.

I - With **I** use am, was, wasn't do, don't and have.

He, she, it, and singular nouns - Use with is, isn't was, wasn't does, doesn't has, and hasn't.

You - With you and with plural nouns use are, aren't were weren't do, don't have and haven't.

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TESTING SCORES

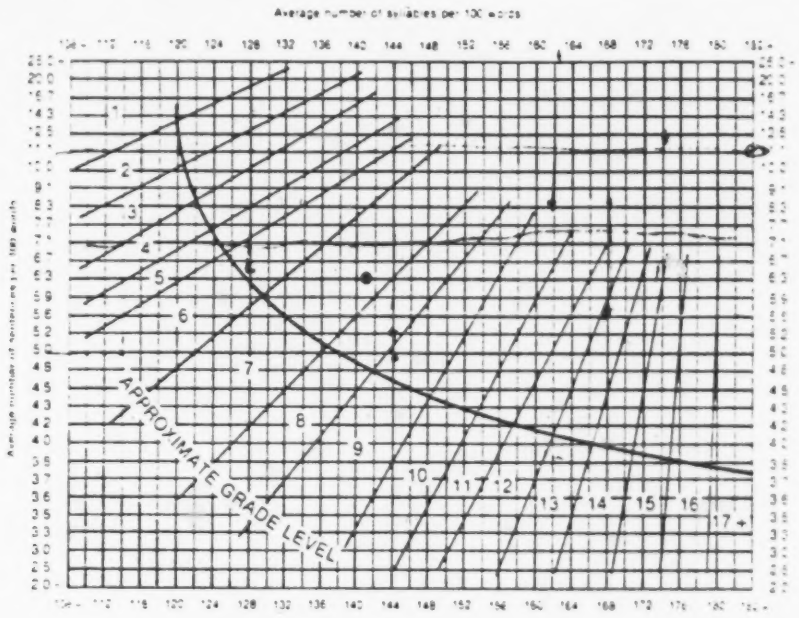
Chart #10

Name:

	Gates McGinite Reading Inventory		APT/Form A Standardized Inventory	
Entry Date:		Date:	Date:	Exit Date:
Vocabulary				
Comprehension				
APT/Form A Mathematics				

Chart #11

BOX 25 Fry Readability Graph



Expanded Directions for Working Readability Graph

1. Randomly select three (3) sample passages and count out exactly 100 words each, beginning with the beginning of a sentence. Do count proper nouns, initializations, and numerals.
2. Count the number of sentences in the hundred words, estimating length of the fraction of the last sentence to the nearest one-tenth.
3. Count the total number of syllables in the 100-word passage. If you don't have a hand counter available an easy way is to simply put a mark above every syllable over one in each word, then when you get to the end of the passage, count the number of marks and add 100. Small calculators can also be used as counters by pushing numeral 1 then push the + sign for each word or syllable.
4. Enter graph with *average* sentence length and *average* number of syllables; plot dot where the two lines intersect. Area where dot is plotted will give you the approximate grade level.
5. If a great deal of variability is found in syllable count or sentence count, putting more samples into the average is desirable.
6. A word is defined as a group of symbols with a space on either side; thus, *1945*, is one word.
7. A syllable is defined as a phonetic syllable. Generally, there are as many syllables as vowel sounds. For example, *stopped* is one syllable and *wanted* is two syllables. When counting syllables for numerals and initializations, count one syllable for each symbol. For example, *1945* is four syllables.

SOURCE: Edward Fry, "Fry's readability graph: clarifications, validity, and extension to level 17," *Journal of Reading*, 21 (1977): 242-252.
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